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Applicant: Oxaal, Ford

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Examiner: Yang, Ryan R.

Title: Method for Interactively Viewing Full-Surround Image Data and Apparatus Therefore

Art Unit: 2628

Docket No.: GRND.24C

AMENDMENT AND REQUEST TO WITHDRAW PRE-APPEAL SUBMISSION

MS: Non-Fee Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated 5/22/2007, the following amendments and remarks are respectfully submitted. Any extension of time necessary to prevent abandonment has been requested, and any fee necessary for consideration of this paper has been authorized to be charged to Deposit Account Number 07-2320.

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method of modeling of the visible world using full-surround image data, said method comprising:

selecting a view point within a p-surface;

selecting a direction of view within the p-surface;

texture mapping full-surround image data onto said p-surface such that the resultant texture map is substantially equivalent to projecting full-surround image data onto the p-surface from said view point to thereby generate a texture mapped p-surface; and

displaying a predetermined portion of said texture mapped p-surface.

2-16. (Cancelled)

17. (Previously Presented)   The method of claim 1, wherein the p-surface comprises polygons approximating a partial sphere.

18. (Previously Presented)   The method of claim 1, wherein the p-surface comprises one or more polygons such that there exists a half-space for each polygon, and wherein the intersection of all such half-spaces includes at least one point in common.

19. (Previously Presented)   The method of claim 18, wherein a point is within the p-surface if it is included in the intersection.

20. (Previously Presented)   The method of claim 1, wherein the p-surface comprises one or more polygons, and wherein a point is within the p-surface if it is included in the union of a given set of half-planes, wherein the set includes no more than one half-plane per polygon.

21. (Previously Presented)   The method of claim 1, wherein the p-surface comprises one or more polygons, and wherein a point is within the p-surface if it is included in the intersection of a given set of half-planes, wherein the set includes no more than one half-plane per polygon.

22. (Previously Presented)   The method of claim 1, wherein the full-surround image data is a sample of incoming image data.

23.-42 (Cancelled)

43. (New) A method of modeling a hemispheric view, said method comprising:

capturing a first texture p-surface data set approximating a first hemisphere portion derived from a first fisheye lens, said first texture p-surface data set comprising at least a portion of full-surround data;

selecting a view point within the p-surface;

selecting a direction of view within the p-surface;

texture mapping the full-surround image data to a triangulation approximating the first hemisphere onto the p-surface substantially equivalent to projecting the full-surround image data onto the p-surface from said view point;

generating a texture mapped p-surface corresponding to the selected view; and

displaying the selected view of the texture mapped p-surface.

44. (New) The method of Claim 43, wherein the full-surround data includes a full hemisphere.

45. (New) The method of Claim 43, wherein the full-surround data includes a partial hemisphere.

46. (New) The method of Claim 43, further comprising steps of:

capturing a second texture p-surface data set approximating a second hemisphere portion derived from a second fisheye lens, said second texture p-surface data set comprising a portion of full-surround data; and

combining the first p-surface texture data set and the second p-surface texture data set to generate the full-surround data.

47. (New) The method of Claim 46, wherein the full-surround data includes a full sphere.

48. (New) The method of Claim 46, wherein the full-surround data includes a partial sphere.

49. (New) The method of Claim 43, further comprising steps of:

capturing a second texture p-surface data set approximating a second hemisphere portion derived from the first fisheye lens after movement to a second view, said second p-surface texture data set comprising a portion of full-surround data; and

combining the first texture p-surface data set and the second texture p-surface data set to generate the full-surround data.

50. (New) A method of modeling an image from a fisheye lens, said method comprising:

texture mapping image data from the fisheye lens onto a triangulation of at least a portion of a first hemisphere of full-surround data onto a p-surface;

selecting a viewpoint within the p-surface;

selecting a direction of view within the p-surface;

selecting a perspective of view;

generating a texture mapped p-surface corresponding to the selected view from the selected perspective using the full-surround data; and

displaying the generated view of the texture mapped p-surface.

51. (New) The method of Claim 50, wherein the full-surround data includes a full hemisphere.

52. (New) The method of Claim 50, wherein the full-surround data includes a partial hemisphere.

53. (New) The method of Claim 50, further comprising the steps of:
texture mapping image data from the fisheye lens onto a triangulation approximating at least a portion of a second hemisphere of full-surround data onto a p-surface;
combining the full-surround data onto a combined p-surface of the portions of the first hemisphere and the second hemisphere to provide a full-surround data set of at least a portion of a sphere including more than a hemisphere.

54. (New) The method of Claim 51, wherein the full-surround data includes a full sphere.

55. (New) The method of Claim 51, wherein the full-surround data includes a partial sphere.

56. (New) The method of Claim 50, further comprising the steps of:
texture mapping image data from a second fisheye lens onto a triangulation approximating at least a portion of a second hemisphere of full-surround data onto a p-surface;
combining the full-surround data onto a combined p-surface of the first hemisphere and the second hemisphere to provide a full-surround data set of at least a portion of a sphere including more than a hemisphere.

57. (New) The method of Claim 50, further comprising the steps of:
texture mapping image data from a nth fisheye lens onto a triangulation approximating at least portion of a nth hemisphere of full-surround data onto a p-surface, wherein n designates one of a y number of fisheye lens which

collectively capture overlapping at least a portion of the y hemispheres of image data;

combining the full-surround data onto a combined p-surface of the first hemisphere and the nth hemisphere to provide a full-surround data set of at least a portion of a sphere including more than a hemisphere.

58. (New) The method of Claim 51, wherein the full-surround data includes a full sphere.

59. (New) The method of Claim 51, wherein the full-surround data includes a partial sphere.

REMARKS

Claims 1 and 17-42 are currently pending in the present application. Claims 23-42 are cancelled, without prejudice. Applicants have added new Claims 43-59. Applicant wishes to file this amendment and briefly respond to the Examiners rejections in the Office Action dated May 22, 2007.

I. APPLICANT'S SPECIFICATION ADEQUATELY SUPPORTS CLAIMS 17-21

The Examiner asserted that "the specification does not disclose the p-surface is comprised of one or more polygons."

Dependent Claims 17-21 recite, respectively:

17. The method of claim 1, wherein the p-surface comprises polygons approximating a partial sphere.

18. The method of claim 1, wherein the p-surface comprises one or more polygons such that there exists a half-space for each polygon, and wherein the intersection of all such half-spaces includes at least one point in common.

19. The method of claim 18, wherein a point is within the p-surface if it is included in the intersection.

20. The method of claim 1, wherein the p-surface comprises one or more polygons, and wherein a point is within the p-surface if it is included in the union of a given set of half-planes, wherein the set includes no more than one half-plane per polygon.

21. The method of claim 1, wherein the p-surface comprises one or more polygons, and wherein a point is within the p-surface if it is included in the intersection of a given set of half-planes, wherein the set includes no more than one half-plane per polygon.

Paragraph [0036], page 12 of the Application provides a definition of a P-Surface and further provides evidence of P-Surfaces that are comprised of one or more polygons:

> P-Surface: a computer graphics representation of any surface with a well-defined inside and outside, where there exists at least one point x inside (neither intersecting, nor lying outside) the surface which may be connected to every point of the surface with a distinct line segment, no portion of which said line segment lies outside the surface or intersects the surface at a point not an endpoint. The union of all such points x form the region X of the p-surface. For a convex p-surface, the region X is all points of the interior of the p-surface. Examples of computer graphics objects which may be modeled as p-surfaces: tetrahedron, cube, sphere, ellipsoid, cylinder, apple torus, lemon torus, b-spline surfaces closed or periodic in u and v. A p-sphere is a p-surface.

Examples of P-Surfaces listed that are considered polygons, by definition, are, for example, a tetrahedron and a cube Moreover, it is well-recognized that the written description requirement is satisfied by disclosure of descriptive means such as formulas, words, structures, figures, and diagram. *Enzo Biochem Inc. v. Gen-Probe,* 285 F.3d 1013, 62 USPQ2d 1609, 1617 (Fed. Cir. 2002) ("[W]e clarified that the written description requirement is satisfied by the patentee's disclosure of such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention."). Applicant has provided a definition of P-Surface and provided specific examples of polygonal structures for the P-Surface in the specification, no further evidence or showing should be required to satisfy the written description requirement of 35 U.S.C. 112, first paragraph.

Furthermore, polygons are well known in the 3D graphics art for computer modeling to generate image data. Texture mapping, as used in the claims, is a well known part of 3D computer graphics. It is inherent to this field of technology for 3D computer graphics and texture mapping that polygons may be used.

Additionally, at paragraph 0033, it is stated:

> It should be mentioned that when the user selects a viewpoint at the center of this sphere and renders the view using the primitives of a conventional 3D graphics system ...

"Primitives" is a well known term of the present art referring to polygons (among other things) in a conventional 3D computer graphics system. One of ordinary skill in the art, reading that term in the context of the present claims and specification, would inherently understand the meaning and scope of the invention, and would also understand that the inventor of the present application had possession of the claimed invention, and was claiming the polygons as described.

II. APPLICANT'S SPECIFICATION ADEQUATELY SUPPORTS CLAIM 22

In rejecting claim 22 under 35 U.S.C. § 112, first paragraph, the Office Action asserts that "the specification does not disclose the full-surround data is a sample of incoming image data." Dependent Claim 22 recites:

22. The method of claim 1, wherein the full-surround image data is a sample of incoming image data.

Applicant's specification at paragraph [0036], page 11, provides a definition of full-surround image data. It states:

> FULL-SURROUND IMAGE DATA: **data which samples the points P.** This data encodes, explicitly or implicitly, the association of a color value with a given direction from a given point of projection. It should be mentioned at this point that **full-surround image data is useful in many fields of entertainment because, when delivered to many viewers, it enables the construction of an independent viewing system defined below.** *(emphasis added).*

> "The points P" is defined in Applicant's specification at paragraph [0036], page 11: POINTS P: The visible world.

The full-surround image data that is delivered to viewers, as provided by definition, *supra,* would necessarily be incoming data. For example, full-surround image data can comprise texture maps built from two fishlens pictures. *Para 0042-0044.* Further, Applicant discloses in para 0049 that "multiple users can receive a single set of full-surround image data and generate corresponding multiple display images....." Based on the Applicant's specification definitions of Full-Surround Image Data and Points P, and context of the specification, it would be clear to one of ordinary skill in the art, that Full-Surround Image Data could be, by definition, a sample of incoming image data as recited by Claim 22. Furthermore, the subject matter is supported in USPN 5,903,782, which is incorporated by reference at page 16 of the present specification. That patent teaches a camera to capture images using wide angle camera systems.

III. THE REJECTION OF CLAIM 1 UNDER 35 U.S.C. § 102 IS AN ERROR OF LAW AND FACT

Claim 1 was rejected under 35 U.S.C. 102 as being anticipated by Chiang et at. ("Chiang"), U.S. 6,028,584. Claim 1 recites:

A method of modeling of the visible world using full-surround image data, said method comprising:

selecting a view point within a p-surface;

selecting a direction of view within the p-surface;

texture mapping full-surround image data onto said p-surface such that the resultant texture map is substantially equivalent to projecting full-surround image data onto the p-surface from said view point to thereby generate a texture mapped p-surface; and

displaying a predetermined portion of said texture mapped p-surface.

Applicant's independent Claim 1 clearly requires the limitation of full-surround data. Chiang does not teach or fairly suggest full-surround image data. Chiang teaches only panoramic image data. The Office Action maps the limitation "texture mapping full-surround image data" by referencing Figure 4 of Chiang and states at paragraph 10 of the Office Action:

..texture mapping full-surround image data onto said p-surface such that the resultant texture map is substantially equivalent to **projecting full-surround image data onto the p-surface** from said view point to thereby generate a texture mapped p-surface *(Figure 4 is a texture mapping process where the texture map is substantially equivalent to projecting full-surround image data onto the p-surface).*

However, Chiang's Figure 4 discloses only a panoramic, 360° view, wrapped around a cylinder with limited vertical panning. No where in Chiang is this described as full-surround image data. The full-surround image data in the invention is taken from a fishlens camera, which captures an approximate hemisphere field of view of data. Chiang uses a panoramic camera to take panoramic pictures, which is essentially a cylindrical data set. *See Chiang*, col 5, ln 27-35 and USPN 5,903,782, col 1, ln 33-50.

It is impossible for a panoramic camera to capture the same image data as a fishlens. Therefore, it is impossible for panoramic data and full-surround data to be the same data. *See also* USPN 5,903,782, col 1, ln 33-38 (incorporated by reference).

This is not using the specification to read limitations into the claims. On the contrary, the claims **MUST** be interpreted in light of the specification. *Phillips v. AWH*, 415 F.3d 1303, 75 U.S.P.Q.2d 1321 (Fed. Cir. 2005). *Phillips* requires that "claims must be read in view of the specification, of which they are a part." Neither the specification nor drawings support a rational interpretation that equates the panoramic data (i.e. cylindrical data set) of Chiang with full-surround data (i.e. hemispherical data set) of the invention. Any such analysis arriving at such a conclusion is contrary to the law.

V. NEW CLAIMS 43-59 DO NOT ADD NEW MATTER TO THE CLAIMS

Claims 43-59 add new limitations pertaining to full-surround data and hemispheres. As explained in the present application and USPN 5,903,782, full-surround data is captured by fishlens visual systems and derived from approximate hemispheric world views. *See Application, paras 42-44 and USPN 5,903,782, col 2, ln 1-27, ln 56 – ln 64*. However, full-surround data is not necessarily a sphere or even a hemisphere, though full-data necessarily is derived from an approximate hemisphere view, whether using a fishlens or some other visual image system.

IV. WITHDRAWAL OF PRE-APPEAL SUBMISSION FROM THE RECORD

Applicant is concerned that the Pre-Appeal Brief in this matter made substantive mistakes that misconstrue the scope of the claim language regarding full-surround data. Applicant requests that the Pre-Appeal Brief be stricken from the record, or in the alternative, that any argument construed as limiting the scope of the claims to only complete spheres be disregarded. Full-surround data can include spheres or any combination of hemispheres that covers less than a sphere of data.

Conclusion

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

February 8, 2008   Respectfully submitted,

Malcolm Pipes, Reg. No. 46,995
Attorney for Applicant

Customer Number 29106
Groover & Associates
PO Box 802889
Dallas, TX 75380
Tel: 972-980-5840
Fax: 972-980-5841

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Pursuant to 37 C>F>R>1.8, I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commission for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on ___February 8, 2008_____ ..

By: _Carol Boultinghouse_____

Carol Boultinghouse